ABSTRACT

A fiber-optic waveguide comprises: 1) an evanescent waveguide fiber segment; and 2) first and second longitudinally adjacent fiber segments joined to the ends of the evanescent waveguide fiber segment and having cores that form, with the core of the evanescent waveguide fiber segment, a substantially continuous core of the fiber-optic waveguide. The cladding layers of the adjacent fiber segments substantially surround the cores thereof and substantially transversely encompass an optical mode propagating through the fiber-optic waveguide. The cladding layer of the evanescent waveguide fiber segment is asymmetrically disposed about at least a portion of the core thereof, thereby yielding a coupling portion of the cladding layer surface and enabling an evanescent portion of the propagating optical mode to extend transversely beyond at least a portion of the coupling portion of the cladding layer surface of the evanescent waveguide fiber segment. The fiber-optic waveguide may be incorporated into an optical power control device by tangentially engaging the coupling portion of the cladding layer surface of the evanescent waveguide fiber segment with a WGM optical resonator, thereby enabling control of optical power transmitted through the fiber-optic waveguide via modulation of WGM resonator properties and/or optical coupling thereto. The fiber-optic waveguide may be fabricated by circumferentially asymmetric removal of cladding material from the evanescent waveguide fiber segment. The cladding material may be removed by providing a mask for the adjacent fiber segments and a portion of the length and circumference of the evanescent waveguide fiber segment, and etching the cladding layer material.